Nantucket Memorial Airport Master Plan Update

Chapter 3- Environmental Overview

2015

Prepared for:
Nantucket Memorial Airport Commission

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Chapter 3- Environmental Overview

This chapter describes the existing environmental conditions ACK and describes the environmental inventories activities to date as part of the Master Plan Process.

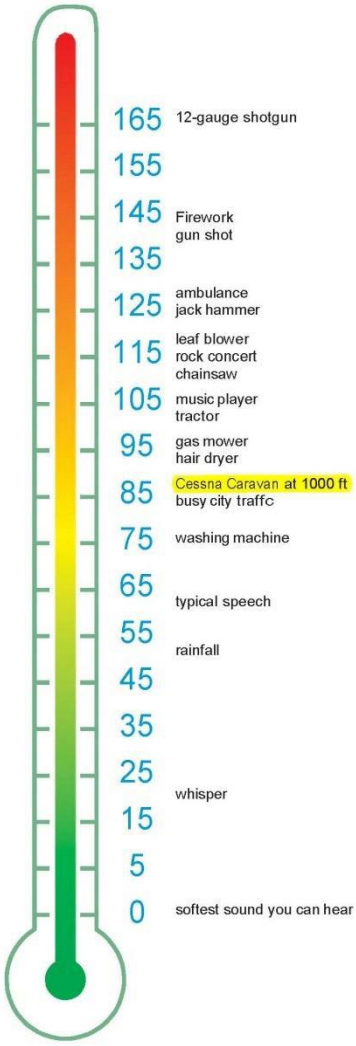
3.1 Noise

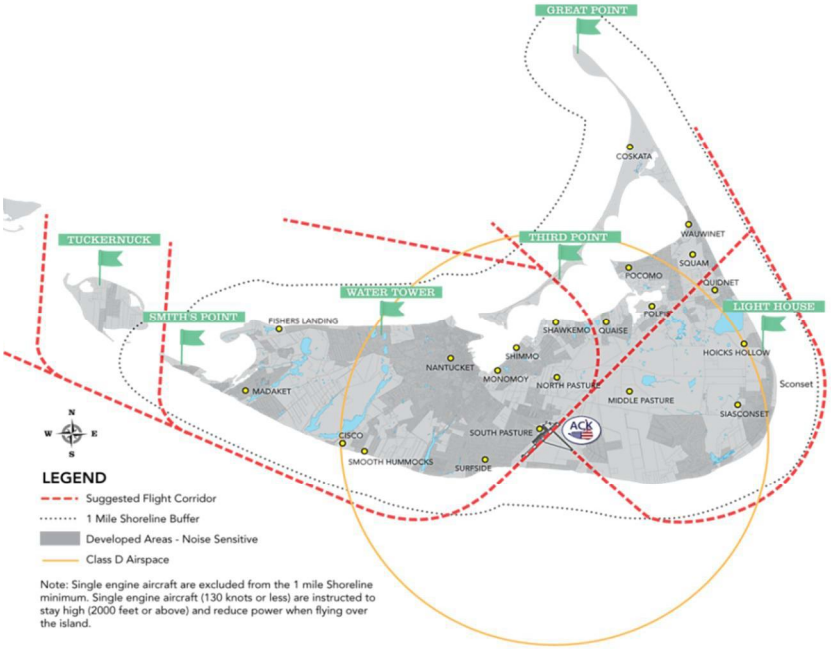
As a vacation destination, maintenance of peace and quiet on the island is of high importance to the Nantucket community. The airport has been looking into ways to reduce noise from operations for many years.

In order to mitigate noise impacts from overland flights, volunteer flight patterns were instituted in 1987 with a "Notice to Airmen" included with pilots pay stubs that provided preferred flight paths around the island that were designed to reduce on the ground noise levels. The volunteer flight tracks shift more of the aircraft flight paths over water rather than over the island. Incentives are provided to airlines in the way of reduced landing fees for compliance with the noise abatement program. The figure below (**Figure 3-1**) shows the flight track patterns currently in use as noise abatement procedures for the airport. In 2011, 2012 and 2013 the Nantucket Memorial Airport (ACK) Commission worked with a noise and vibration consultant, KM Chng, to further evaluate aircraft operations and related noise to ensure that the airport continues to operate as a "good neighbor" to the community. The 2011 study focused on ground operations at the airport to determine existing levels of noise at nearby receptors and identify noise levels of taxiing aircraft and noise from aircraft running their Auxiliary Power Units (APU's). As a result of the study, aircraft are now parked on the Apron with engines pointing away from nearby residential areas, and airmen are encouraged to limit APU use to the minimum required for pre or post flight. Pilots are also encouraged to request alternative parking locations if APU's use is anticipated to be required for longer periods.

In 2013, six off airport locations were chosen for noise monitoring during a peak season week at Nantucket. Noise monitoring was coordinated with flight tracks and with different types of aircraft to get a better understanding flight paths and their corresponding ground noise levels. These noise levels will provide the baseline for comparison of future noise levels associated with any proposed shift in noise generating activities at the airport so that changes to existing noise levels, if any, will be understood. The technical Noise Analysis prepared by KM Chng is included in **Appendix 1**.

Figure 3-1 – Voluntary Flight Paths to Promote Noise Reduction





Noise Complaints

The airport has been collecting detailed noise complaint data since 1996. The greatest number of complaints typically falls during the times of highest use of the airport, typically in May, June, July and August. The number of complaints has generally trended down since 2008.

The airport prepares and issues a monthly noise complaint report and tracks individual commercial compliance with noise abatement procedures. Costs of the voluntary noise abatement program have also been estimated, as well as it's impacts on fuel consumption and sustainability principles. These are discussed further in section 3.17.

In addition to the ACK instituted measures to mitigate noise, FAA has established noise impact levels for airports. These thresholds will be used in determining potential impacts from proposed projects and determining what noise mitigation may be required for a specific project.

3.2 Air Quality

Through the requirements of the Clean Air Act [42 USC Sections 7409, 7410, and 7502-7514], the United States Environmental Protection Agency sets health standards for air quality in the United States. Data from ambient monitoring stations are used to ensure compliance with these standards and develop attainment plans for areas where the standards are not met. Regions of the US are designated as attaining these standards or not attaining these standards for six different pollutants, including ozone (O_3) carbon monoxide (CO), Nitrogen dioxide (NO_2), sulfur dioxide (SO_2) lead (Pb) and particulate matter of differing sizes (PM-10 and PM 2.5). The 2010 Report on Air Quality in New England indicates that the state of Massachusetts is in nonattainment for Ozone for the 1 hour ozone standard. Ground level ozone, the main component in urban smog, is unhealthy to breathe and can damage trees and crops. Ozone is formed when nitrogen oxides react with hydrocarbons in the air on hot, sunny days with little wind. The main sources of the pollutants that cause ozone are cars and trucks, coal-fired power plants and other industry. Much of the ozone precursors, as well as ozone, are transported into Massachusetts from out-of-state sources (Massachusetts Department of Public Health).

FAA Order 5050.4A (Section 47(e)(5)(c) determines airport activity thresholds that trigger air quality analysis for airport actions. For a General Aviation airport, if the proposed airport action would occur at an airport having a total of 180,000 general aviation and air taxi annual operations, an air quality analysis is required. Nantucket Memorial Airport does not exceed 180,000 total operations in a year and is therefore below the threshold for air quality analysis. The proposed actions that may occur as part of the Master Plan will not exceed this threshold. However, areas where the airport can consider and improve air quality, particularly with a focus on controlling emissions that contribute to ground level ozone, will continue to be a goal of both the master planning process and the sustainability planning process.

3.3 Coastal Resources

The entire island of Nantucket is located within the designated coastal zone for Massachusetts. This Master Plan will be distributed to the Massachusetts Office of Coastal Zone Management to ensure consistency with state standards and the Massachusetts Coastal Zone Management Plan. It is not anticipated that any of the Master Plan Elements will be inconsistent with state standards.

The Airport is located on the southern part of the island and its property boundaries include areas of coastal dunes and beaches with public access. Coastal erosion is an ongoing concern at various locations throughout the island, including along the dunes located south of Runway 6-24. The airport coordinates with other island groups to help develop comprehensive plans for best management practices to address existing coastal erosion and anticipated effects from future sea level rise.

In order to gain an understanding of potential future changes at the approach end of RW 6, Jacobs assembled existing readily available information on changes that have occurred along the southern beaches in the recent past. This included examination of available historical aerial imagery and shoreline change information prepared by the Massachusetts Office of Coastal Management. Although past changes cannot be assumed to represent an accurate estimate of future changes, they can be useful in identifying trends in erosion and/or accretion that could impact the Airport. The shoreline change data

shows that the beaches have been in constant change over the entire period evaluated. Based on the earliest maps available (1845), there has been a general trend of erosion at Nobadeer Beach, where the shoreline has retreated over 1,200 feet in that timeframe. Nobadeer Beach at ACK has shown a net gain in beach since 1994, but has been eroding since 2000. To maximize the benefits of the accretion since 1994, we recommend expanding active beach management at Nobadeer to better stabilize the beach and dune system and help solidify the gains. At the top of the dune, the airport perimeter fence is being undermined as a result of dune loss and will likely need to be relocated.

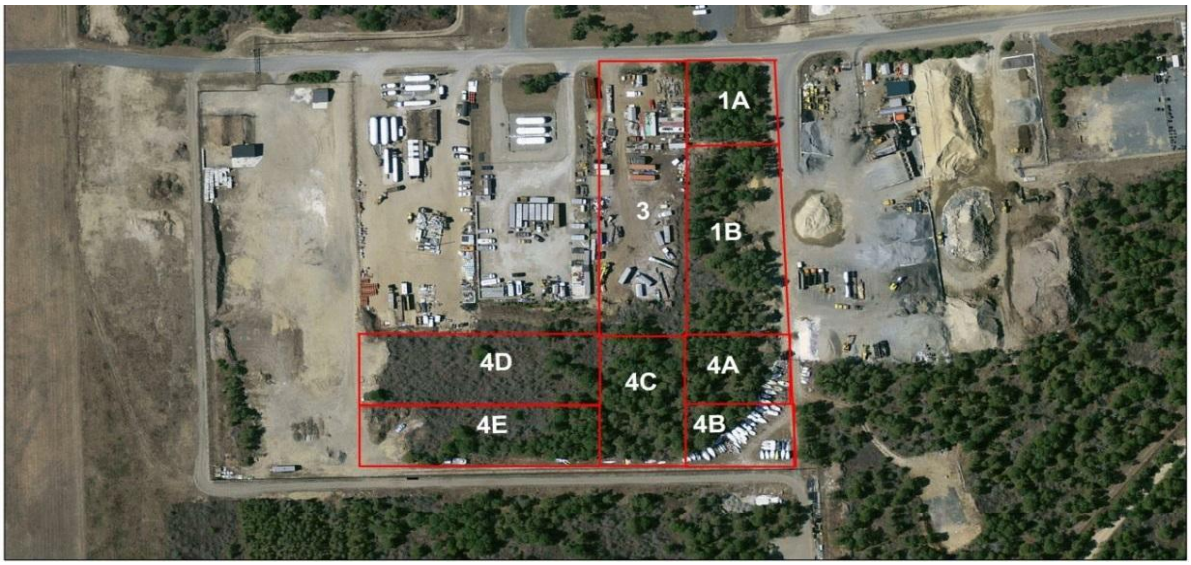
The Coastal Resources technical report, including figures showing shoreline historic trends, is included as **Appendix 2**. Consideration of sea level rise, trends in coastal erosion and various methods for minimizing coastal erosion and will be incorporated into planning decisions.

3.4 Compatible Land Uses

Air service has been ongoing at this location since 1927, when the first planes began flying between Boston and Nantucket. Prior to being used for air service, most of the land was used in agricultural use. The airport was turned over to the town in 1941 and was used by the Navy during World War II from 1941 to 1945. The town constructed two paved runways, taxiways, parking ramps airfield lights and a control tower. Over the years upgrades have been made to improve operations and comply with FAA guidelines, including a terminal building and construction of a third runway. Of the 971.3 acres owned by the Airport, lands used for aviation and commercial purposes totals approximately 405 acres (42%). The five-member Nantucket Airport Commission is responsible for the care and operation of the Airport, and the land upon which the airport is located.

The Airport's "Bunker Area" is located on airport land, but outside the fence to the north of Runway 15/33. The area is so-named due to the presence of WWII ammunition storage bunkers left over from US Naval Aviation activities. This qualifies the area, and other parts of the airport as a Formerly Used Defense Site (FUDS), as listed by the US Army Corps of Engineers (see Section 3.15, below). The area accommodates commercial and industrial land uses that are not compatible with the residential nature of other areas on the island. These uses – including an asphalt batch plant, a concrete batch plant, and storage facilities – serve vital island needs in a setting well removed from the village centers and most residential neighborhoods. In return, the use of airport land for commercial purposes provides a source of revenue enabling it to develop financial stability. The figure below shows the layout of the parcels. Parcels 4B, 1B 3 and 4A are under agreement. Parcels 1A and 4E are currently vacant. Parcels 4C and 4D have been awarded but the lease has not been executed as of the time of this plan.

Figure 3-2 - Bunker Parcel Future Leases



3.5 Section 4(f) Parcels

Section 4(f) of the Department of Transportation Act of 1966 provides protection to parklands, historic sites, and other special resources from impacts from transportation projects. This statute requires that "the Secretary of Transportation may approve a transportation program or project requiring the use of publicly owned land of a park, recreation area, wildlife or waterfowl refuge, or public and private historical sites only if 1) there is no feasible and prudent alternative to using that land and 2) the program or project includes all possible planning to minimize harm…." The airport currently hosts a baseball field that is open to the public.

3.6 Farmlands

There are no farmlands on the airport property or within the vicinity of the airport.

3.7 Fish, Wildlife and Plants (Endangered Species)

Due to its geologic location and vegetation management operations, Nantucket Memorial Airport is home to several species of concern (See **Figure 3-3** on page 88 for area of state mapped habitat). These include plant, moth and bird species. The sandy soils at the airport, combined with the vegetation management of areas to remain free of obstructions such as trees and shrubs, result in conditions at the airport that support grassland vegetative species. Sandplain grasslands and scrublands have become a rare habitat in the northeast due to forest succession and encroaching development. Therefore, the presence of these types of habitat on the airport make them locally important. In addition, the airport

and its surrounding forest are host to habitat for several species invertebrates and birds that are considered rare in the state. Surveys for rare vegetation are conducted at the airport regularly.

Federally listed Species of Concern

The Nantucket county listings for endangered species, (published by the United States Fish and Wildlife Service), includes three federally protected species. Two of these species, the roseate tern and piping plover, are found in habitats with coastal dunes. And one, the American Burying beetle, is found in upland grassed meadow habitat. Coastal dune habitats are not found within the airfield operating areas at Nantucket Memorial Airport, but are found to the south of the airport, outside the fence area. None of these species were found on the airport property during any previous field studies.

State listed Species of Concern

Endangered Species studies for state listed species of concern are ongoing at the airport in accordance with the Conservation Management Permit (008-123 DFW) issued in 2008 and amended in 2013. Various sandplain grassland plant species are found at the airport, several of which are listed by the state of Massachusetts as threatened, rare or endangered. In 2008, the airport instituted a sandplain grassland vegetation management plan. The results of rare species monitoring at the airport are reported to Natural Heritage and Endangered Species Program on a regular basis in compliance with all previous permits. The airport has committed to maintaining this unique ecosystem by continuing to manage the property in accordance with the Conservation Management Plan. **Figures 3-3 and 3-4** show the locations of mapped habitat and areas where airport manages habitat for state listed species.

The 2008 Conservation Management Permit allowed for a "take" of rare species, with provisions and mitigation that would ultimately result in a net benefit to the species affected. The Conservation Management Permit and the Habitat Management Plan require botanical surveys, transplants of potentially affected plants, construction monitoring, and monitoring of invasive species throughout the airport. Of the 971.3 acres at the airport, 280 are under long term management for habitat. This management area includes mitigation for impacts from a proposed project that was never built (Runway 33 parallel taxiway). The taxiway was anticipated to impact 11.2 cares of habitat for blazing star and blue eyed grass species. This impact did not occur and the airport effectively has a "mitigation bank" for this impact.

Surveys for grassland plant species, were conducted annually in 2012, 2013 and 2014. Individuals were located in several locations throughout the airport. The results of the 2013 botanical survey show some species have reached population levels that make them secure at this location. Several thousand individual Sandplain blue eyed grass plants were found within the airport boundaries as well as numerous occurrences of mature Lion's foot, and to a lesser extent, papilose nut sedge. The table below indicates the species that were surveyed for and the presence or absence of these species within the airport boundaries. **Appendix 3** includes the technical report for the Endangered Species surveys.

Summary of presence or absence of State Listed Species in targeted Areas at ACK in 2011-2013

Common Name	*Scientific Name*	State Status	On NHESP List	Observed in 2012
Moths				
Coastal Heath Cutworm	*Abagrotis nefascia*	SC	Y	N
Barrens Daggermoth	*Acronicta albarufa*	T	Y	Y
Gerhard's Underwing Moth	*Catocala herodias gerhardii*	SC	Y	Y
Waxed Sallow	*Chaetaglaea cerata*	SC	N	Y
Melsheimer's Sack Bearer	*Cicinnus melsheimeri*	T	Y	Y
Unexpected Cycnia	*Cycnia inopinatus*	T	N	Y
Sandplain Euchlaena	*Euchlaena madusaria*	SC	Y	Y
Slender Clearwing Sphinx	*Hemaris gracilis*	SC	Y	N
Barrens Buckmoth	*Hemileuca maia*	SC	Y	Y
Sandplain Heterocampa	*Heterocampa varia*	T	Y	Y
Pine Barrens Lycia	*Lycia ypsilon*	T	Y	Y
Barrens Metarranthis	*Metarranthis apiciaria*	E	Y	N
Coastal Swamp Metarranthis	*Metarranthis pilosaria*	SC	Y	Y
Imperial Moth	*Eacles imperialis*	T	Y	Y
Pink Sallow	*Psectaglaea carnosa*	SC	Y	Y
Southern Ptichodis	*Ptichodis bistrigata*	T	N	Y
Pine Barrens Speranza	*Speranza exonerata*	SC	Y	Y
Faded Gray Geometer	*Stenoporpia polygrammaria*	T	Y	Y
Pine Barrens Zale	*Zale lunifera*	SC	Y	N
Beetle				
Purple Tiger Beetle	*Cicindela purpurea*	SC	Y	Y
Birds				
Grasshopper Sparrow	*Ammodramus savannarum*	T	Y	Y

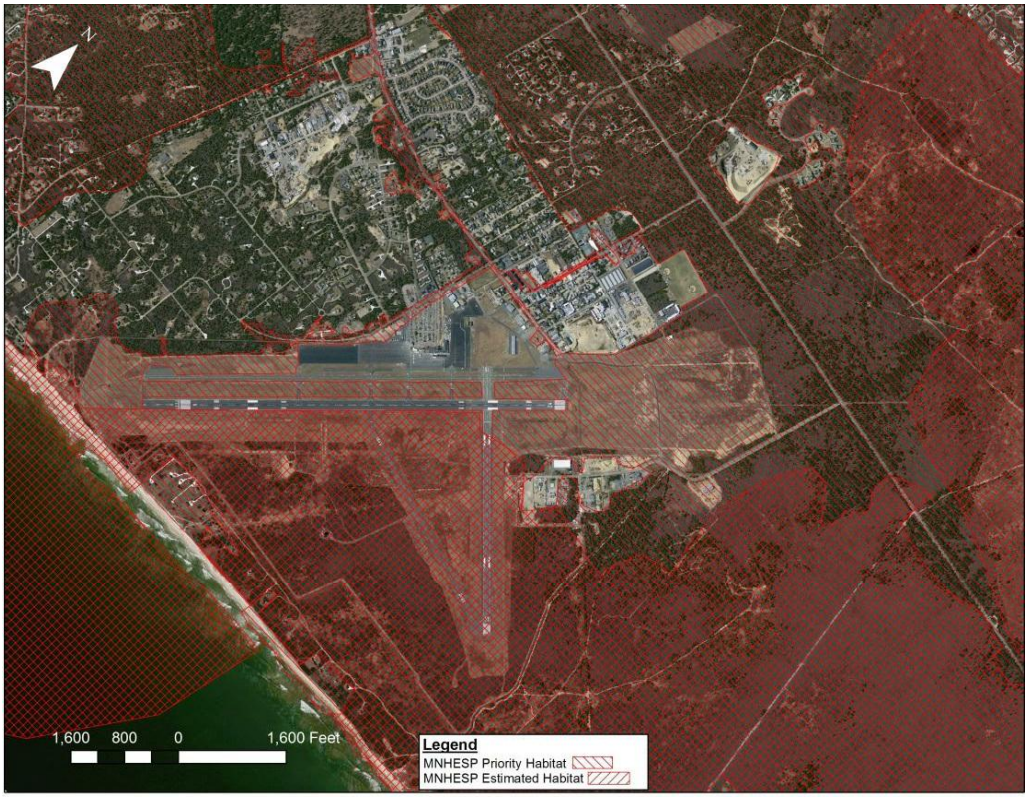
Continued on following page

Common Name	*Scientific Name*	State Status	On NHESP List	Observed in 2012
Eastern Whip-poor-will	*Caprimulgus vociferus*	SC	Y	Y
Northern Harrier	*Circus cyaneus*	T	Y	N
Plants				
Purple Needlegrass	*Aristida purpurescens*	T	Y	N
Sandplain Flax	*Linum intercursum*	SC	Y	Y
Lion's Foot	*Nabalus serpentarius*	E	Y	N
Papillose Nut-Sedge	*Scleria pauciflora*	E	Y	Y
Sandplain Blue-Eyed Grass	*Sisyrinchium fuscatum*	SC	Y	Y
New England Blazing Star	*Liatris scariosa var nova-angliae*	SC	Y	Y

SC=Special Concern, T=Threatened, E=Endangered

The presence of listed species habitat coupled with the commitment of certain areas for long term mitigation for previous impacts, creates challenges for the airport in locating new infrastructure. The airport will continue to monitor these areas for new species and consider ways to avoid impacts to listed species and their habitat. Balancing the requirements and needs of ongoing airport operations with maintenance of habitat can be challenging. Where conflicts arise, safety of airport operations is paramount. Therefore it is of mutual benefit to both the species of concern, and the airport, to conduct a long term plan for habitat maintenance and airport operations.

Figure 3-3 - Mapped Habitat for State Listed Species



The airport actively manages certain areas for habitat protection and betterment in accordance with an approved grasslands management plan and draft Ecological Management Plan. The EMP is an adaptive plan to track management activities and determine their effectiveness in promoting suitable habitat for listed species. A Technical Advisory Committee meets yearly to discuss the EMP, operations and botanical survey results. The TAC helps to make informed changes to the Ecological Management Plan to promote best practices. The Figure below shows the areas currently included in the Vegetative Management Plan for ACK. There are three different schedules or treatments for vegetation management. The first, Schedule 1, is regular mowing to comply with airport operational and safety areas requirements. Schedule 2 areas are proposed to be cut every 2-3 years to keep out woody vegetation, but allow for propagation of herbaceous plant species. Schedule 3 is proposed for areas of the airport that are currently vegetated with scrub oak and pitch pine type cover. These areas provide for moth habitat when the trees are younger. A prescribed burn or selective cutting to reduce older growth in these areas is part of the vegetation management plan for the airport. Portions of this area underwent a controlled burn in late 2013. Others may be selectively burned in 2014 when wind conditions are favorable.

2013 Botanical surveys also revealed evidence of invasive species encroaching onto the airport property. Knotweed (*Fallopia japonica*) and knapweed (*Centaurea biebersteinii*) were identified in areas that were under investigation for listed plant species. A full airport survey for invasive plants was not conducted. Knapweed is problematic for habitat in that it takes hold in habitat that grassland species prefer, and

can out-compete the listed species for space. Knotweed is problematic from both a habitat consideration and from an airport maintenance consideration, as this species has been shown to grow aggressively enough to impact the quality of paved surfaces.

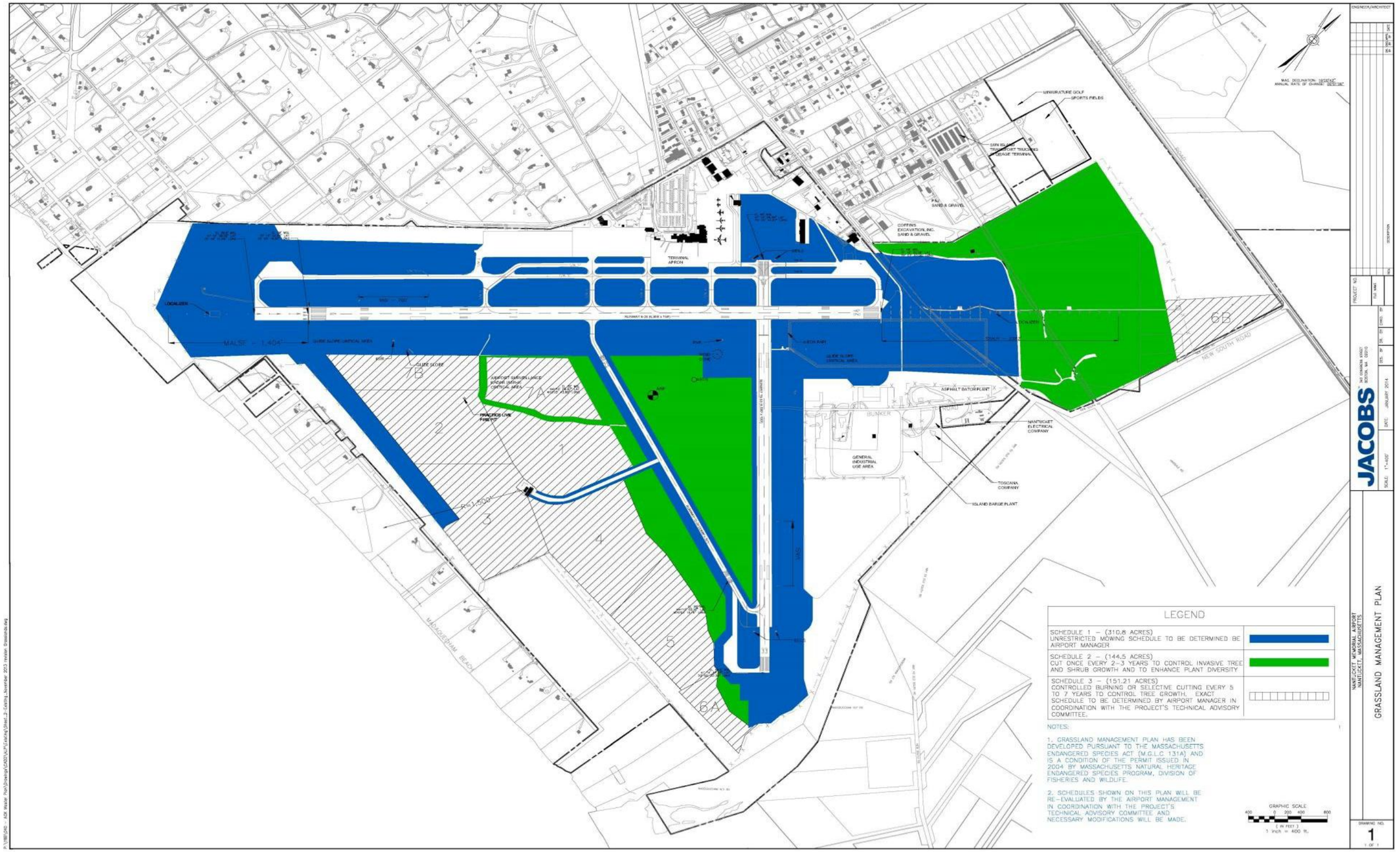
3.8 Floodplains

FEMA has mapped an area of coastal flooding (Zone VE) that falls within the airport property at the end of runway 6/24 where the coastline is included in the airport property.

3.9 Topography

The topography within the vicinity of the airport is generally flat, with elevations ranging between approximately 30 and 50 meters above sea level NGVD. Elevations slope to the south towards the Atlantic.

Figure 3-4 - Grassland Management Plan



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3.10 Groundwater

The entire island, including the airport property, is underlain by a designated sole source aquifer. A sole source aquifer is defined as the source of 50 percent or more drinking water for a given area where there are no reasonable alternate sources. The airport is also immediately southeast of the Zone II for the municipal drinking water wells operated by the Wannacomet Water Company. A Zone II is defined by DEP as the areas of an aquifer which contributes to a well under the most sever pumping and recharge conditions that can be realistically anticipated. The design of all airport projects must take into account the groundwater protection requirements of this designation and ensure that all protections are in place to comply with state and local groundwater regulations. The slope of the groundwater table in the area of the airport is generally flat. Based on the need for maintaining the high quality of groundwater in the area, the airport is committed to an extensive groundwater management plan. The practices used at the airport to protect this resource include the following:

- Ensuring hazardous materials are handled in compliance with regulations and in accordance with the Spill Prevention Control and Countermeasures Plan
- Upgrading underground fuel tanks older than 10 years
- Developing the groundwater monitoring plan
- Developing and implementing a training program for airport personnel
- Identifying clean up methodologies

Groundwater monitoring is conducted by the Wannacomet Water Company annually at the airport. This monitoring is conducted in compliance with EPA requirements. Testing includes detection of the deicing chemical propylene glycol among the list of monitored substances in the groundwater monitoring program.

3.11 Stormwater

Stormwater management at the Airport is achieved through a series of catch basins, dry wells vegetated swales and leaching basins. The sandy soils allow for infiltration in most areas. Along runway 6/24 stormwater is infiltrated either though dry wells or through a surface infiltration area. Stormwater runoff from runway 12/30 is directed to vegetated swales for infiltration. Stormwater flowing from 15/33 is directed to a series of drywells for infiltration. A combination of vegetated swales and dry wells collect water from the remaining taxiways, parking areas and other paved surfaces at the airport.

3.12 Waste Water

Wastewater generated at the airport is discharged to municipal sewer. Areas within the Bunker Road parcel are not on municipal sewer and have local septic systems.

3.13 Wetlands

There are no jurisdictional wetlands on the airport property.

3.14 Wild and Scenic Rivers

There are no designated Wild and Scenic Rivers on or in the vicinity of the airport.

3.15 Hazardous Materials/Pollution Prevention/Solid Waste

A Spill Prevention Control and Countermeasures Plan (SPCCP) was developed in 2007 and was updated in April of 2012. The SPCCP plan details the locations of hazardous material within the operational areas of the airport and on airport leased property, as well as identifies persons with responsibility for each location. The plan is available from the Nantucket Airport Environmental Coordinator's office and is attached to the Master Plan by reference.

Of the 971.3 acres of Airport property, approximately 90 are paved for use as taxiways, runways and parking aprons. The eastern portion of the Airport Property, commonly referred to as the Bunker Area, houses two natural gas storage and transfer facilities, an asphalt plant, the Snow Removal Equipment Building and several contractor storage facilities More than 40 Tenant businesses operate on airport property, the majority of which provide airport related services. Tenant operations include maintenance and servicing of aircraft and associated equipment, aviation fuel transfer and general facility maintenance. Operations related to aircraft maintenance include engine maintenance, electronics repair hydraulics system repair, aircraft washing, body repair, aircraft deicing and wheel and tire maintenance and repair. Maintenance of airport vehicles occurs at the SRE facility, and includes fluid changes, filter changes, refueling, brake repair, body repair, minor painting and washing.

Airport operations responsibilities include fuel transfer, traffic control, airport security equipment operations and maintenance, facility maintenance and ground keeping. Oil and hazardous materials use and storage at the airport includes aviation fuel, oil, lube oil, waste oil, deicing solution, paints, industrial chemicals, compressed gas, solvents and cleaning solutions. Airport Operations Maintains a Massachusetts Hazardous Waste Generator ID (MAD985290634) and is classified as a small quantity generator, generating between 100 kg and 1,000 kg of hazardous waste per month.

The most recent inventory of hazardous material at the airport was conducted as part of the SPCCP update. Inspections of airport tenant facilities are conducted on a regular basis to ensure compliance with Massachusetts Hazardous Waste Regulations (310 CMR 30.000). The Airport SPCCP details best management practices that detail requirements for storage of hazardous material.

After a storm event, stormwater contained within the Airport fuel farm's secondary containment structure is visually inspected for evidence of contamination. Stormwater determined to be free of contamination is discharged via a submersible pump to the Airport's stormwater system, where it is infiltrated. In the event of a discharge of oil or hazardous material to a secondary containment structure or the observation of contaminants in collected stormwater within a containment area, a licensed contractor provides for proper removal, transfer and disposal.

Aircraft fuel storage is conducted in accordance with state regulations (310 CMR 30.000) and FAA circular 150/5230-4B. Airport staff is trained in proper handling, storage and refueling procedures.

FUDS

Portions of the airport are listed by the US Army as a Formerly Used Defense Site (FUDS). See Figure 3-5 for the FUDS Boundary. The Department of Defense is responsible for environmental restoration of

properties that were formerly owned by, leased to or otherwise possessed by the United States and under the jurisdiction of the Secretary of Defense. The Army executes this program and the U.S. Army Corps of Engineers manages and directs the program's administration. FUDS cleanups can include remediation of munitions that remain on site. Nantucket Memorial Airport is listed as a Military Munitions Response Program site. The completion of FUDs cleanup for this location is being scheduled and is anticipated to begin in September of 2014 with a contract award for clean-up activities.

Figure 3-5 – Limits of FUDS at Nantucket Memorial Airport

3.16 Historic and Archaeological Resources

Section 106 of the National Historic Preservation Act of 1966 requires Federal agencies to consider the effects of their projects on properties that are listed in, or are eligible for listing in, the National Register of Historic Places. The lead Federal agency for a project must determine whether any property located within the project's Area of Potential Effect (APE) is listed in, or may be eligible for listing in, the National Register. The APE for archaeological resources is defined as locations where the proposed project may alter or disturb surface and/or subsurface soils that contain, or have the potential to contain, archaeological sites. The review process is administered at the Federal level by the President's Advisory Council on Historic Preservation and at the state level by the State Historic Preservation Officer (SHPO).

Historic Sensitivity

The airport is located within the Nantucket Historic District, which is listed in the State and National Registers of Historic Places. The historic district is also a National Historic Landmark District and a Local Historic District. The historic district comprises the entire island and includes 2,400 contributing properties. The airport does not contain any properties contributing to the historic district, nor any individual historic resources listed in the Inventory of the Historic and Archaeological Assets of the Commonwealth.

Nantucket Memorial Airport was created in the late 1930's when a Mr. Holm allowed the Town to use the fields south of his farmhouse on Old South Road at Nobadeer as an airfield. The United States Navy assumed control of the airfield during World War II and constructed temporary buildings and ammunition bunkers. The ammunition bunkers remain extant and are typical of their type, built of sandbag concrete and earth construction with steel doors, and are used for general storage. There are also two or three sheds remaining from this period.

Following the war, the Navy's temporary buildings were removed, and a new construction program began in the early 1950s with the construction of the passenger terminal and FAA control tower, maintenance garage, and other buildings, along with runway improvements. During the ensuing years, older buildings were replaced by new structures, the 1950's structures were renovated, additional runway improvements were made, and a radar station was built. In 1992, the passenger terminal and air control tower were remodeled and joined by a connector and were made handicapped-accessible.

The late-nineteenth-century Holm farmhouse remains standing just outside airport property. The building has been heavily altered by additions and lacks any sense of its original open setting, as modern residential buildings closely surround it. Houses surrounding the airport for a radius of approximately one-half mile were built within the last 50 years.

Archaeological Sensitivity

The historic period archaeological sensitivity of the Nantucket Airport is based on its proximity to the previously identified eighteenth-century historic Native American settlement of Miacomet on the island. Activities associated with the community may have continued until 1782, when the meetinghouse was finally removed. Eighteenth century Native American houses adapted from the pre-contact period wigwam style were most likely constructed on the ground surface, and could be identified archaeologically based on assemblages found at other historic Native American house sites on Nantucket. Archaeological evidence of later historic period sheep raising activity is also possible.

The archaeological sensitivity of the Nantucket Airport property is suspected to be high based on its favorable environmental setting and the numerous recorded archaeological sites in similar settings close by, as referenced in the MHC State site files. Over 10 pre-contact sites are located within one-mile of the Airport, including a site on airport which yielded a ca. 3000 year old Small Stemmed projectile point collected from the ground surface during an archaeological survey by PAL in 1995 for perimeter fencing. Less than one kilometer (.6 miles) north of the airport along Old South Road, a Contact period or older Native American burial was identified, along with Archaic Period stone projectile points during the removal of sand and gravel sometime between 1940 and 1978 (MHC Site Files). Based on the frequency

and temporal range of pre-contact sites within and surrounding the Airport, potential pre-contact site types could range from find spots of single artifacts (points) and small temporary camps to larger multi-component sites dating back at least 8000 years to 450 years ago.

The future development of the project area will require review and/or permitting under MEPA and NEPA and Section 106 of the Historic Preservation Act. State agency review will require consultation with the SHPO. Based on anticipated project effects, the FAA will make an initial federal finding under the NHPA, and will seek SHPO concurrence. If archaeological investigations are required, the proposed areas of moderate sensitivity would likely be scoped for intensive survey.

3.17 Sustainability

There are numerous benefits to implementing sustainable practices at airports including, lower energy consumption, lower waste production, reduced noise and emissions, and better public relations. These can lead to cost savings for airports in both the short and long term. The first step in any sustainability assessment is the inventory of existing conditions at the airport as it operates today. Many of the criteria used to evaluate sustainability are included as part of the overall master planning process for airports, including noise evaluations, and forecasts of growth.

Nantucket Memorial Airport has already implemented numerous improvements to promote sustainable practices and energy use reduction including a geothermal heating and cooling unit for the terminal building, electric car charging stations, low flow sinks and toilets in the terminal building and promotion of LED use throughout the airport.

The Nantucket Memorial Airport was recently selected by MassDOT aeronautics and the Volpe Transportation Center to be the first carbon neutral airport in the country. This program will provide the airport with incentives and partnering opportunities to promote reduced energy consumption for its ground facilities and operations, and promote the development of renewable energy production on the airport. This program's first phase, which is currently underway, consists of collecting data to develop a comprehensive baseline inventory of all greenhouse gasses under the airport's control. Staff from Volpe and MassDOT will identify operations emissions, such as transportation and refrigerant use. The key step to the first phase is evaluating proposals from various energy service companies and then selecting a company to implement these energy savings measures.

The second phase consists of implementing the energy savings measures. Net carbon neutrality may be achieved by reducing energy demand, converting remaining energy users to lower carbon sources, and/or offsetting emissions through renewable energy generation or credits. Reducing energy demand will be realized though efficiency projects, such as upgrades to retrofit mechanical equipment and lighting systems, and conservation projects, such as new automation systems, operational changes, and staff training. Some examples of renewable energy sources under consideration are solar panels (both ground and roof mounted), biofuel conversion, and geothermal expansion.

In addition to the sustainable practices already adopted at the airport, the program will promote the development of best practices in energy reduction to be shared with other airports across the United

States. Efficiency will likely involve major upgrades to retrofit mechanical equipment, lighting systems and other facilities. New automation systems and operational changes will achieve additional energy savings. On-site renewable energy will be generated with the goal of equaling or exceeding energy consumption that cannot be eliminated.

Measuring the existing conditions and using suitability criteria as a core principal in planning will help drive the project development process as part of this Master Plan. Results of the energy audit and commitments made during the carbon neutral program will be used to help guide decision making within the Master Plan.

Existing Noise Mitigation Flight Path

As described above, the airport has encouraged the use of flight paths that have a larger portion of the flight track over water, rather than over land, to minimize noise impacts to people on the ground. This results in a longer flight path for aircraft to reach the airport. The noise abatement flight path between Hyannis and Nantucket Memorial Airport is approximately 5 miles longer. This results in an increased fuel burn and related cost for all aircraft utilizing the noise mitigation flight paths. For the air taxi service (Cessna 402's) the mitigation flight paths result in an estimated 1.32 gallons of additional fuel burn per flight. Since 1997, using operations data for the just this aircraft type flying under visual flight conditions, it is estimated that 1,077,215 gallons of additional fuel were expended to comply with noise abatement flight tracks. EPA's conversion calculator estimates that this is equivalent to 9,576 metric tons of Carbon Dioxide over 20 years (478.8 metric tons per year)[1].

The price of Aviation gas runs roughly $2.00 higher than automobile gas (2014 prices for NE Avgas @ $6.17/gal; High Test auto @ $4.02/gal = $2 difference). Based on US Dept. of Energy fuel costs data for high test auto gas, plus the $2.00 added cost for Avgas, the average annual cost for Avgas has risen from $3.33/gallon in 1994 to $6.17/gallon in 2014, which yields an average Avgas cost of $4.75 per gallon over the 20 year period. The estimated 1,077,215 gallons burned by the 402's has cost about $ 5.1 million to fly the Noise Abatement route. That does not include the GA fleet or corporate operations that also fly the Noise Abatement routes.

[1] http://www.epa.gov/cleanenergy/energy-resources/calculator.html